Math 331: Abstract Algebra-Rings & Fields   Syllabus   Fall 2020

Professor Cindy McCabe	Office Hours	Class Meeting Times
Office: B246 Science Building Phone: 715–346–2085 Email: cmccabe@uwsp.edu www.uwsp.edu/mathsci	Online 10:00-10:50 Mondays 2:00-2:50 Tuesdays 1:00-1:50pm Thursdays *or by appointment*	Online Tuesdays, Thursdays, and some Fridays 10:00 – 10:50am

Text (available for rental): *Abstract Algebra - An Introduction*, 3rd ed., by T. W. Hungerford, from Cengage, ISBN: 978-1-111-56962-4, topics primarily from Chapters 1 – 6.

Prerequisites: Math 230 (Introduction to Linear Algebra) and Math 300 (Introduction to Proof)

Objectives for students in this course:
To learn to think and communicate better mathematically through the study of abstract algebra. To gain an understanding of introductory topics of rings and fields. To be able to think about abstract objects, to write mathematical proofs, and to communicate mathematical ideas verbally.

Students will be able to:
1) find congruence classes in various settings,
2) perform arithmetic in the integers modulo n, F[x], quotient rings, and fields,
3) classify new sets (with operations) as rings, fields, or groups,
4) identify homomorphisms and isomorphisms and properties they preserve,
5) categorize elements as prime, irreducible, or reducible, and
6) communicate mathematical ideas in written and verbal form, supporting logical deductions and presenting convincing mathematical proofs.

These objectives align with the following Program Learning Outcomes of the Department of Mathematical Sciences. For example:
1) Patterns – recognize, characterize, and generalize patterns using mathematical language
2) Communication –accurately interpret, clearly write, and orally express mathematical concepts in a variety of settings. This includes mathematical terminology, mathematical theorems, and mathematical proofs.

Evaluation: Final course grades will be determined by the following:
        75 points for bi-weekly quizzes, (highest 5 scores, 15 points each)
        70 points for bi-weekly homework assignments (10 points each)
        150 points for daily work, sometimes done in groups (highest 30 scores, 5 points each)
        15 points for a small project
        90 points for the final exam
 Total: 400 points for this course

Course Grades at or above	93.3 373	90 360	86.7 347	83.3 333	80 320	76.7 307	73.3 293	70 280	66.7 266	60 240	% Points
will receive at least a grade of	A	A -	B +	B	B -	C +	C	C -	D +	D	

I reserve the right to exercise discretion in raising a student's grade if the final course percentage does not appear to reflect the quality of a student's work (for example, because of one low exam score early in the course). I will not use discretionary judgments to lower a student's course grade.

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Graded Work: To accomplish the course objectives, you need experience thinking about new topics on your own, expressing your ideas and conclusions in written form, and talking with others about abstract algebra. Therefore:

1) There will be **daily work** almost every Tuesday, Thursday, and Friday that is not a quiz day. This will often be done in groups and will involve sharing your ideas. Some days you will need to prepare text exercises ahead of time. This daily work will be worth 5 points each time. Your highest 30 scores will be part of your semester grade, which leaves you with at least three that will be dropped. This is meant as formative assessment, so grades here will be based on evaluations of *Solid performance – 5 points*, *Substantial contribution – 3 or 4 points, Partial understanding exhibited – 1 or 2 points,* or *No contribution – 0 points*.

2) Most weeks that do not include a quiz will be weeks when a **homework** assignment is due. This is meant to be formative assessment, so written comments will be given and homework grades (out of 10 points each) will mostly be based on evidence of thoughtful completion of the assignment. You may be asked to be a class expert on a particular homework question once in a while. We will spend some class time or online discussion time on these questions.

3) Each homework set, in combination with reading assignments and the daily work we do, is intended to be a *minimal* list of items which you need to understand in order to do well in this course. This work is extremely important, so make sure you stay on top of it and ask questions on whatever you don't understand. The effort you put into your homework and daily work, and into studying your work after completion, will have a big impact on your semester grade, both directly and through the improved quiz and exam scores that it produces.

4) We will have a small **project** which will involve writing (less than five pages) about abstract algebra and about your learning process. It may be assigned in two or three parts. More details will be given when these get closer.

5) The six **quiz** dates have been set (every other Tuesday, starting on Sept. 15), but the material covered on each will be announced in class ahead of time. The lowest quiz score will be dropped. Our only exam will be the **final exam**, scheduled for 8:00 – 10:00am on Monday, December 14. A topics list will be given.

I do not anticipate other graded items, but if any arise, they will be announced and the course points will be adjusted.

Academic Integrity: For many of us, working online is a new environment. It is important for you to engage with our topics, use your brain, use appropriate resources, and turn in work that is your own (or your group's work for group assignments). I will do my best to let you know what appropriate resources are. Please ask if you are not sure. It is not okay to copy another's work and turn it in as your own. It is okay to talk with others about homework, daily work, and general studying.

Attendance Policy: Attendance is expected at every synchronous class meeting, and going online is expected on asynchronous days. It is the student's responsibility to make prompt arrangements with me for finding out what was missed and for making up any assigned work in the case of an absence. Often this can be done by viewing the module of the week in Canvas. When it is not possible to stay online during our synchronous meetings, there will be a way to make up points and work in Canvas. If a major disruptive life event occurs, contact the Dean of Students as soon as possible (contact information below). They will then contact me and your other professors, and we can see how to proceed from there.

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Communication: Announcements, homework assignments, course grade information, and other course information will be in **Canvas**. To access Canvas, go to https://www.uwsp.edu , choose Canvas from the "Logins" dropdown menu, and use your regular campus login ID and password. Occasionally I may send the class an **email** also, using your UWSP address. Email is a good way to contact me (cmccabe@uwsp.edu).

Inclusivity Statement: It is my intent that students from all diverse backgrounds and perspectives be well-served by this course, that students' learning needs be addressed both in and out of class, and that the diversity brought by everyone in this class be viewed as a resource, strength, and benefit. It is my intent to present materials and activities that are respectful of diversity. I encourage you to make suggestions to this end. Please let me know ways to improve the effectiveness of the course for you personally, or for other students or student groups.

If you have experienced a bias incident (an act of conduct, speech, or expression to which a bias motive is evident as a contributing factor regardless of whether the act is criminal) at UWSP, you have the right to report it using this link. You may also contact the **Dean of Students** office directly at dos@uwsp.edu.

UWSP is committed to providing reasonable and appropriate **accommodations** to students with disabilities and temporary impairments. If you have a disability or acquire an impairment or injury during the semester and you need assistance, please contact the * Disability and Assistive Technology Center as soon as possible, on the 6th floor of Albertson Hall (library), at 715-346-3365, or at DATC@uwsp.edu. You may also want to visit http://www.uwsp.edu/disability/Pages/default.aspx.

All students are expected to know the UWSP student **responsibilities** found on the Dean of Students webpage. Information on Academic Concerns is available at https://www.uwsp.edu/dos/Pages/stu-academic.aspx. Information on Conduct Concerns and on Personal Concerns are also available on the Dean of Students site.

Incompletes: A grade of incomplete may be given when circumstances arise which are beyond the student's control, and which result in the student being unable to complete the course. A grade of incomplete will only be used if the student is passing when the circumstances arise.

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DIVISIBILITY

In $\mathbb{Z}$, polynomials, and more   *PRIMES*

In $\mathbb{Z}$, polynomials, and more

CONGRUENCE
When are two objects the same?
When are they similar enough to be grouped together?

QUOTIENTS
$\mathbb{Z}$ = {…, -2, -1, 0, 1, 2, …}
$5\mathbb{Z}$ {…, -10, -5, 0, 5, 10, …}

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